

(3) Occasionally there are striking similarities in the elements of two planets, e.g.

|                  | <i>a</i>   | <i>e</i> | <i>i</i> | $\Omega$ | $\omega$ |
|------------------|--|----------|----------|----------|----------|
| (251) Sophie     | ... 3°10' ... 0°09' ... 10° 29' ... 157° ... 80° 16' |          |          |          |          |
| (318) Magdalena. | 3°19' ... 0°07' ... 10° 33' ... 163° ... 80° 5'      |          |          |          |          |

The resemblance of the elements in the case quoted is far closer than is reasonably probable, even for a selected pair out of several hundred planets. We, however, are much inclined to doubt whether it is more than an accident. A famous case of coincidence is that between the periods of rotation and revolution of the moon. Here there is a controlling cause tending to produce equality, and the equality is exact. Now in the case of the elements of Sophie and Magdalena, we suppose that there are only three possible hypotheses:—(i.) accidental resemblance; (ii.) a cause tending to produce similarity; (iii.) a common origin with no subsequent connection. We may take as analogies:—(i) two watches that have run down, but happen by accident to show nearly the same time; (ii.) two clocks synchronised with each other; (iii.) two clocks, each constructed with the same object of exhibiting mean time, but entirely independent of each other subsequently. Now, as regards (ii.), we may remark that in the present instance the supposed controlling force has done its work very imperfectly. The objection to (iii.) is that a common origin hypothesis can only be applied in a few isolated cases, of which the above is one, and therefore we ourselves feel inclined to fall back upon (i.), the hypothesis of accidental resemblance, although we fully admit its antecedent improbability.

In the early part of the book an estimate is given of the total mass of the asteroids. It would appear that the entire mass is very far short of a quarter of the mass of the earth, very far short indeed of the mass that would have been expected if a single planet had filled the gap in Bode's law between Mars and Jupiter.

In a few cases approximate linear dimensions are given, founded on measures by Barnard in 1894.

We must congratulate M. Mascart on a very interesting and exhaustive work. We regret, however, the absence of a complete list of all known asteroids with their elements. We should have been glad to have seen such a list in several different forms, with the small planets arranged in order of mean motion, eccentricity, longitude of perihelion, and in the various other ways mentioned in the book. It would have enabled us to follow the arguments from statistics with greater appreciation, and the value of the book as a work of reference would have been much increased. The work admirably fulfils the design of the author.

#### SIR BENJAMIN BAKER, K.C.B., F.R.S.

SIR BENJAMIN BAKER, whose sudden death in his sixty-seventh year we recorded last week, had a distinguished career as an engineer, and was concerned more or less directly with most of the great engineering schemes of recent years. By his death the profession of civil engineering is deprived of one of its leading members, and the scientific world of a man who combined scientific knowledge with practical training and experience. He was a constant contributor to early volumes of *NATURE*, and his writings and addresses cover a wide field of applied science.

Sir Benjamin Baker was born in 1840, and for the last thirty years or so was engaged in the design and construction of important engineering works at home and abroad. He carried out numerous investigations

relating to the strength of materials and of engineering structures generally, and contributed papers thereon to various scientific societies. He was the author of "A Theoretical Investigation into the Most Advantageous System of Constructing Bridges of Great Span," upon which plan the Forth Bridge and six of the largest bridges in the world have been built.

His name will be remembered chiefly in connection with the Forth Bridge and the great dam across the Nile at Assouan. On the completion, in 1890, of the former engineering feat Sir Benjamin Baker was made K.C.M.G., and when the dam at Assouan was finished in 1902 he was made K.C.B., and received at the same time the first-class of the Order of the Medjidieh from the Khedive. Two years ago plans were submitted to him for the raising of the Assouan dam, and since then he had worked more or less continuously at the subject of stresses on dams. A note by him upon the project appeared in the *Earl of Cromer's* recent despatch respecting the water supply of Egypt; and in it he stated that a design had been evolved which satisfied all the theoretical and practical conditions, and rendered the storage of nearly two and a half times the present quantity of water in the reservoir a simple problem.

Though his name will always be associated first with the famous works mentioned, Sir Benjamin Baker took a very active part in other great engineering enterprises in many parts of the world. He had much to do with making the Metropolitan Railway, and was associated more recently with the construction of the various tubes for electric traffic under London.

Sir Benjamin Baker was elected a Fellow of the Royal Society in 1890, and in 1895 he became president of the Institution of Civil Engineers. Honorary degrees were conferred upon him by the Universities of Cambridge and Edinburgh, by the Irish Academy, and other learned bodies. He was closely associated with the various engineering societies, and was actively interested in the work of the British Association and the Royal Institution. He was a member of the council of the Institution of Mechanical Engineers, and an honorary member of the American and Canadian Societies of Civil Engineers, and the American Society of Mechanical Engineers. His unexpected death will be deplored wherever pure and applied science are studied, and his personal friends have suffered a loss that cannot easily be realised by those who did not know his broad interests and sympathetic nature.

#### NOTES.

THE Senate of the State of Pennsylvania has voted 70,000 to the American Philosophical Society to provide a fitting memorial to Benjamin Franklin.

SIR WILLIAM RAMSAY, K.C.B., has received through the Foreign Office the Order of Commendatore della Corona d'Italia from the King of Italy, together with King Edward's permission to wear it.

At the anniversary meeting of the Linnean Society on May 24, the Linnean medal, awarded by the council to Dr. Melchior Treub, director of the State Botanic Garden at Buitenzorg, Java, was formally handed to Mr. Van Royen, councillor of the Netherlands Legation, who undertook to transmit the medal to Dr. Treub.

MR. ANDREW WATT has been elected meteorological secretary of the Scottish Meteorological Society in succession to the late Dr. Buchan, F.R.S. Mr. Watt has since 1900 been closely associated with Dr. Buchan in the discussion of rainfall and other important meteorological problems.

THE Maccabæans, a society of Jewish literary and scientific men, gave a dinner at the Hotel Great Central on May 22 at which some of the leading members of the medical profession were present. Before the dinner a telegram was dispatched to Lord Lister, sending him respectful salutations. Lord Lister replied, returning his warmest thanks to the Maccabæans for their message.

THE Transvaal Government Gazette of April 20 announces the appointment of a commission, consisting of the following gentlemen, Dr. Kynaston (Geological Survey Department), Mr. T. N. Leslie (Vereeniging), Mr. J. P. Johnson (Johannesburg), and Prof. R. B. Young (Transvaal University College), "to report to the Government on the Bushmen paintings and stone etchings existing in the Transvaal, and as to what steps should be taken to preserve them from decay and mutilation."

SPEAKING at the forty-seventh annual dinner of King's College, London, on Monday, May 27, Dr. Headlam, the principal, referred to the loss which the college has sustained by the death of Dr. MacFadyean, and suggested that there should be a public recognition of one who died as a martyr in the cause of science, and for the sake of amelioration of disease and the benefit of the human race. Alluding to the incorporation of the college with the University of London, and to the appeal for funds made in connection therewith, he mentioned that the Goldsmiths' and the Clothworkers' Company have each contributed 5000*l.*, and that other promises and donations bring the amount subscribed up to the present time to 15,000*l.*

REUTER'S representative at Upsala records that the celebrations at the University of Upsala on the occasion of the 200th anniversary of the birth of Linnæus took place on May 23. The Crown Prince Regent, the Duke and Duchess of Vester-Gotland, and the Dukes of Nericia and Scania, were present. A speech was made by M. Schuck, the Rector of the University, after which the foreign guests read addresses. The speakers were afterwards presented to the Crown Prince. On May 24 the University held a solemn session in the cathedral for the purpose of conferring the doctorate on distinguished Swedes and foreigners on the occasion of the Linnæus celebrations. Among those upon whom honorary degrees were conferred were Mr. Francis Darwin, F.R.S., and Mr. W. Carruthers, F.R.S. The Crown Prince Regent, the Duke of Scania, and the Duke and Duchess of Vester-Gotland attended the ceremony. We hope to give later an account of the celebrations by one of the British delegates now in Upsala.

WE learn from the *Lancet* that a movement for the institution of an Italian Association for the Advancement of Science, proposed at Milan last year, has now taken form and development under capable organisers, including Prof. Romiti, of Pisa. The first meeting will be held at Parma in September next, when it is hoped that the sister Powers of Europe, as well as those of the New World, will assist in an auspicious "send-off." Italy has many associations for the advancement of special sciences, but, as Prof. Romiti has put it, she has yet to form an association which shall "represent the synthesis" of them all. Attempts were made in 1839 and 1875 to start such an association on the British model, but they have had no successor. It is hoped and believed that the attempt which has now been renewed will result in the establishment of a permanent institution.

THE Aëro Club of the United Kingdom is very active in promoting many aspects of aerial navigation. On Saturday last nine balloons started from the Ranelagh Club, Barnes, in a race for the Harbord Cup, the first balloon leaving at 4 p.m. and the last at 6 p.m. The point to which the balloons were piloted was Goring, in Oxfordshire, and the winner will be the competitor who landed nearest this point. The committee will meet and examine certificates of descents before issuing an official list of placings. On Saturday, June 29, there will be a race for the Hedges Butler Challenge Cup, which will be awarded for the longest voyage in any balloon, airship, or aeroplane on that day. The club offers a silver medal for the best set of photographs taken by a member from a balloon during this year, and a silver and bronze medal for the best set of meteorological observations. Arrangements have also been completed for carrying out a series of important practical experiments in connection with aerial navigation.

THE report of the Departmental Committee appointed to inquire into the probable economic effect of an Act of Parliament limiting work in coal mines to eight hours per day has been issued. It is a document that has been prepared with great care, and forms a valuable addition to economic literature. While, on the whole, the committee is of opinion that its immediate effect would be a reduction in total output of about 26,000,000 tons per annum, it is concluded that because the pits would be worked with more energy, the total reduction would be only about one-half this, while the introduction of improved machinery might still further diminish the reduction. The scientific interests of mining were well represented on the committee by Prof. S. H. Cox, of the Royal School of Mines, and by Prof. R. A. S. Redmayne, of Birmingham.

MR. WALTER WELLMAN, who proposes to make another attempt to reach the North Pole by means of his airship *America*, has left for Norway, on the way to Spitsbergen, where the balloon will be inflated. In the first week of July there will be trials of the airship until it is demonstrated that it is ready for the voyage. The start for the Pole will be made on the first favourable opportunity afterwards, probably between July 20 and August 10, but, if necessary, Mr. Wellman is prepared to start as late as August 20. Mr. Wellman has given Reuter's representative the following particulars of his plans:—The airship has been made 18 feet longer and its lifting power increased by 3000 lb., giving a total lifting force of 19,500 lb. The balloon is 184 feet long and 52 feet in its greatest diameter, its cubic volume being 265,000 cubic feet. With the single exception of Count Zeppelin's airship, this is the largest ever built. The keel or backbone of the airship consists of a steel tank 18 inches in diameter and 115 feet in length, with a capacity for holding 1200 gallons of petrol. At the stern of the vessel is a rudder of some 900 square feet, in the form of a bicycle wheel, which, despite its great size, only weighs 30 lb. A little forward of the centre is placed a very heavy motor, built for endurance and safety, of 70 horse-power, and having a weight of 900 lb. In this new airship the propellers are placed in the centre on either side of the vessel. They consist of two blades of steel, 11 feet in diameter, and capable of 380 revolutions per minute. The living quarters of the airship are in triangular bunk-like spaces within the enclosed steel car. These are capable of accommodating ten or twelve men, twelve dogs, together with the provisions and equipment. The total weight of the steel car



and tank is 2200 lb. The motors, screws, and machinery weigh 1350 lb. In the tank will be carried 6800 lb. of petrol, capable of running the motor for 150 hours at a normal speed of 14 knots. The total radius of action is believed to be 2500 miles, or double the distance from the base to the Pole and back again. The balloon will not ascend more than 300 feet to 500 feet, and a guide-rope will trail over the surface of the earth. Instead of employing a steel line a leather tube has been made, 15 inches in diameter and 130 feet long, and weighing about 1400 lb. This is filled with reserve food weighing 1200 lb., and is suspended from the airship by means of a steel rope. The airship will carry 3000 lb. of food, or enough to enable the crew to subsist on its own stores for a period of ten months.

To vol. iii., No. 1, of the zoological series of the Publications of the University of California, Messrs. E. C. Starks and E. L. Mott contribute a descriptive list of fishes taken off the coast of southern California.

We have to acknowledge the receipt of a copy of the first of a series of "guides" to the Peabody Museum of Natural History at Yale University. This deals with the evolution of the horse family, a subject which has been treated in a very satisfactory manner by Dr. R. S. Lull. The "guide" has previously appeared in the form of an article in the *American Journal of Science*.

A VERY satisfactory result has attended bird protection in a certain district of Norfolk, the black tern (*Hydrochelidon nigra*), which had ceased to breed in that county for a period of something like seventy years, having this season re-established itself in its old nesting haunts. Several nests are recorded, and it is sincerely to be hoped that the species will once more be entitled to a permanent place on the British breeding list.

A PAPER in the Annals of the Natal Government Museum (vol. i., part ii.), by Messrs. E. Hill and L. G. Haydon, on the characters of the larva in certain mosquitoes of the group Anophelina, is of importance in connection with the endeavour to stamp out malaria. All the fifteen species described are referred to genera other than the typical Anopheles. In a second article in the same issue Dr. R. Broom records, for the first time, the occurrence of remains of anomodont reptiles in the Karoo rocks of Natal. They are referred to the genera Dicynodon, Lystrosaurus, and Scymnosaurus, the representatives of the first and third being regarded as new species.

THE evolution of the colour-pattern on the shells of South African land tortoises, more especially those included in the genus Homopus, forms the subject of a paper by Dr. J. E. Duerden in the Records of the Albany Museum (vol. ii., part i.). Starting with species in which each shield of the shell is of the normal horn-colour, the author finds that the first stage is the development of a dark border, followed later by a dark centre. Next the whole shield becomes dark, excepting light lines radiating from the centre, after which the dark area may break up into spots or flecks. In a second paper the same author describes a giraffe head from British East Africa, provisionally identified with *Giraffa camelopardalis tippelskirchi*.

In a paper on the geographical distribution of closely related species, as exemplified by plants, Mr. R. G. Leavitt, in the April number of the *American Naturalist*, comes to the conclusion that the study of specific distribution in the vegetable kingdom is not likely to be unfavourable to mutation, regarded as a method, but

perhaps not the sole method, of evolution." After putting aside certain cases which may be ascribed, for want of a better name, to "geographical effect," the indications suggest that a good many instances favourable to mutation will be forthcoming, and that those who seek to discredit the mutation theory will find it difficult to procure weapons to support their attack from plant evidence.

WE have received from the author, Mr. James Drummond, a copy of a paper on foreign birds acclimatised into New Zealand, published as a Bulletin of the Agricultural Department, and likewise copies of the *Lyttelton Times* of March 23 and 30 containing an account of the bird-sanctuary at Little Barrier Island, near Cape Rodney. As regards the introduction of small birds, which commenced, mainly for sentimental reasons, some sixty years ago, it appears that, on the whole, this has been a mistake, correspondents urging that no more kinds should on any account be admitted. Although sparrows are admitted to have done good in the early days of the colony, when insects were, literally, on the war-path, they are now unmitigated pests, while greenfinches, blackbirds, and even larks (which do enormous damage to young wheat) and thrushes are included in the same category. Little Barrier Island, we are told, comprises 10,000 acres, of which all but about fifty are hilly or mountainous, with abundant timber. It thus appears admirably suited for a bird-sanctuary, and efforts are being made to introduce from the mainland many species not naturally represented on the island.

FOUR parts have been received of the scientific results of the voyage of the *Belgica* (Expédition Antarctique Belge), now in course of publication at Antwerp, in which Mr. E. Hérourard describes the holothurians, Prof. G. W. Müller the ostracods, and Mr. O. Maas the medusas, while a number of writers deal with the comparatively small collection of insects. Out of nine holothurians obtained, no less than five are new, one being referable to a new generic type. All the Antarctic members of this group belong to the family Elpidiidae, of which only a single representative (*Elpidia glacialis*) occurs in Arctic seas. The ostracods of the Antarctic plankton include four species of Conchoecia, of which one is new. Jelly-fish (medusas) are but poorly represented, although two out of the small number of species collected by the *Belgica* are regarded as new. As regards insects, the number of species recorded from the neighbourhood of the Antarctic circle is still infinitesimal as compared with those from the opposite pole, the list comprising merely certain colembolids taken near the Canal de Gerlache by the *Belgica* expedition, a podurid and a pediculid collected by the *Southern Cross*, and a dipterid (*Belgica antarctica*) and a larva described in the fasciculus before us. That fasciculus includes, however, descriptions and figures of a considerable number of insects from the lower part of South America and the Falklands, several of which have received new names.

THE *Philippine Journal of Science* for March (ii., No. 1) contains a paper on filariasis in the Philippines, by Messrs. P. M. Ashburn and C. F. Craig. They consider that the filaria met with in these islands is a new species (named *F. philippinensis*) owing to its lack of periodicity and certain morphological characters. It develops in *Culex fatigans*. Dr. Musgrave contributes an exhaustive paper on paragonimiasis (infection with the fluke, *Paragonimus westermanii*) in the Philippines. The journal is illustrated with a number of plates.

IN the Journal of the Royal Sanitary Institute for May (xxviii., No. 4), Prof. Ronald Ross, F.R.S., discusses some points of interest in connection with tropical sanitation, and Major Horrocks describes some interesting experiments made to determine the conditions under which "specific" bacteria derived from sewage may be present in the air of ventilating pipes, drains, sewers, &c. It would appear that the bursting of bubbles, the separation of dried particles from the walls, and the ejection of minute droplets from flowing sewage, may determine the ejection of specific bacteria from the sewage into the air.

BULLETIN No. 4 of the division of pathology and physiology, issued from the experiment station of the Hawaiian Sugar Planters' Association, has been received. It contains the substance of a lecture, delivered by Dr. N. A. Cobb before the association, on some elements of plant pathology relating to disease in the sugar cane.

MR. D. McALPINE communicates to *Annales Mycologici*, vol. iv., No. 6, an account of the hymenomycete fungus, formerly called *Isaria fuciformis*, as it exists in Australia. Growing on various native grasses and rye-grass, the fungus often forms a conspicuous pest in wet seasons. In general appearance it resembles a *Clavaria*, but the hymenium or spore-producing layer is borne mainly or entirely on the portion of the fungus attached to the host plant, so that the author refers it to the genus *Hypochnus* as *Hypochnus fuciformis*.

A SHORT paper by Mr. R. Fitch appears in *Annales Mycologici* (vol. iv., No. 4) describing some experiments on the action of insoluble substances in modifying the effect of deleterious agents upon fungi. It is known that the action of certain toxic solutions on plants varies according to the degree of concentration and that a very weak solution often stimulates growth. Nägeli discovered that the addition of certain solid materials to solutions reduced the toxicity. Similarly it is found by Mr. Fitch that the introduction of sand or glass is equivalent to weakening the proportion of poison in a given solution.

MR. E. R. BURDON contributes to the *Journal of Economic Biology* (vol. ii., No. 1) an article on the spruce-gall and larch-blight diseases caused by the genus *Chermes* of the Aphidæ. He points out that, according to investigations made in Germany and Russia, both diseases are induced by the same species, and draws up in a tabular form the sequence of generations. Starting from the gall-foundress generation on the spruce, some of the winged insects of the subsequent generation migrate to the larch, pine, or fir, upon which two generations are developed before there is a migration back to the spruce previous to the sexual generation. The galls are only produced on the spruce and by one of the generations. In order to prevent migration, it is recommended that spruce and larch should not be planted together, but should be separated by a belt of other trees. The author discusses various remedies, among them a paraffin emulsion, with which he washed the trees in winter.

AN important addition to the literature on the Phycomycetes will be found in the fifth number of the botanical series of *Memoirs of the Department of Agriculture in India*, wherein Dr. E. J. Butler furnishes an account of the genus *Pythium* and some of the Chytridiaceæ. The memoir contains a phylogenetic review and systematic revision of the genus *Pythium*, for which eighteen species are distinguished, and of these *indigoferæ*, *diacarpum*, *palmisorum*, and *rostratum* are new. The account of

the life-history is based upon the examination of ten species collected in Europe and India. Full details are given of the development and liberation of the zoospores in *Pythium proliferum*. The observations on the Chytridiaceæ made on species of the genera *Pleolpidium*, *Pseudolpidium*, *Olpidium*, *Olpidopsis*, and *Nowakowskiella* enable the author to describe the life-histories of these parasitic fungi.

ON September 2, 1906, twenty years had elapsed since the opening of the Sonnblick Observatory, at an altitude of 10,190 feet above sea-level. From Dr. Hann's summary of the results, it appears that the monthly mean barometric pressure is lowest in March and highest in August. The mean yearly minimum temperature is  $-22^{\circ}2$ , the mean maximum  $49^{\circ}3$ ; the absolute extremes were  $-35^{\circ}0$  in January, 1905, and  $56^{\circ}8$  in July of the same year. The relative humidity is the opposite to that which obtains in the plains—the winter is the driest and the spring and summer the dampest; the afternoon is the dampest period of the day. The mean yearly precipitation amounts to 70.71 inches, of which only about 4.77 inches fall as rain, the remainder being chiefly due to snow. The amount is fairly uniformly distributed throughout the year, the mean number of "rain-days" being 212. Fog occurs on 253 days on an average.

THE report of the committee appointed by the Governor of Hong Kong to inquire whether earlier warning of the disastrous typhoon of September 18 1906, could have been given to shipping has resulted in the exoneration of Dr. Doberck and the observatory staff from blame in the matter. The committee was composed of Sir H. S. Berkeley, K.C., Lieut. H. Butterworth, R.N. (King's Harbour Master), A. B. Skottowe (Eastern Extension Telegraph Co.), and Captain A. Sommerville. The evidence taken by the committee, and the documents referred to, are appended to the report. On the afternoon of September 17 the observatory received telegraphic reports from various stations, including Zi-ka-wei (Shanghai), Swatow, and Manila; the barometer readings at those places pointed to the conclusion that there was a gale in Formosa Channel, apparently travelling N.N.W., but in the opinion of the committee these observations did not call for the hoisting of any typhoon signal in Hong Kong on September 17. The evidence as to the appearance and state of the weather on the evening of September 17 and morning of September 18 is conflicting; the Consul for France thought that the appearance of the sky on September 17 indicated a typhoon not far off. But, reviewing the evidence as a whole, the committee found that prior to 7h. 44m. a.m. on September 18 there was no indication of a typhoon approaching Hong Kong, and that by hoisting the signal drum on the morning of September 18 warning was given as soon as was practicably possible.

AN address on the "Education of the Professional Chemist," delivered by Prof. C. F. Mabery in his capacity of chairman of Section C of the American Association for the Advancement of Science, is printed in *Science* for May 3. It contains a number of points of educational interest. The methods of teaching chemistry in the elementary schools of the United States are severely criticised; they appear very similar to those which have been attacked in this country during the past fifteen years. "The pupil is taught a text-book rather than chemistry," and has inflicted on him a series of definitions and theoretical principles before he has learned correctly to observe a single fact. In spite of this, the students of technical

chemistry appear to be able to overcome at the university such early disadvantages; and we learn that as a result "most manufacturers have a high respect for the advantages afforded by scientific education," and are "ready to receive the young graduate with open cordiality." The lot of the young chemist seems, indeed, to be a particularly happy one in the States in view of the "unprecedented demand for good men." Statistics show that the average salary of the graduates in chemistry of five years' standing from the Case School of Applied Science is about 3000 dollars per annum. At all colleges "there is a far greater demand for graduates than can be supplied." A powerful aid to research has recently arisen in the immense funds devoted by many individuals to this purpose; amongst these the Carnegie foundation for the retirement of teachers is mentioned, "as it relieves the teacher during his earlier years from the anxiety of later need and gives him courage to devote his residual energy in some efforts for the advancement of knowledge."

We have received a copy (printed for private circulation) of the Friday evening discourse delivered by Prof. A. H. Church at the Royal Institution on April 12 on the "Conservation of Urban Stone-work and Wall-paintings." The most active among the agents tending to destroy the stone-work of buildings of historical interest in large towns is undoubtedly the sulphuric acid produced by the combustion of coal used as fuel. It has been estimated that at least half a million tons of sulphuric acid are formed annually in London in this way. Rain charged with the acid gradually converts the surface of the limestone of public buildings (such, for instance, as St. Paul's Cathedral) into gypsum, the increase of volume accompanying the change being responsible, moreover, for a greater or less degree of disintegration of the more delicate mouldings and tracery. An account is given by Prof. Church of the remedial treatment adopted in such cases, based on the use of a solution of baryta, which has the property of re-cementing together the particles of the decayed stone-work. The baryta acts by forming an insoluble sulphate with the gypsum and liberating lime, which, under the influence of carbonic acid from the air, regenerates the original binding cement of the stone. This treatment is applicable, not only to limestones, but also to sandstones which were originally compacted by a calcareous cement. The success attending its use is well illustrated by the experience obtained in the case of the Chapter House at Westminster. "Before treatment a touch of the finger sufficed to bring away the surface of the carving, afterwards the stone was as sound as that newly quarried and harder." To render the stone subsequently resistant to the action of acids it may be covered with a suitable waterproofing coating of paraffin wax. The conservation of mural paintings or frescoes needs in each special case, according to its character, a different process. A number of typical cases of treatment are described.

An interesting article on the life and work of Linnæus, by Mr. G. W. Murdoch, appeared in the *Newcastle Daily Journal* of May 23. We congratulate that journal upon being one of the few daily papers to publish a special article upon Linnæus on the 200th anniversary of his birth.

The *Brazilian Engineering and Mining Review*, which has now reached its fourth annual volume, is a high-class monthly technical journal published in English at Rio de Janeiro. Looking through some back numbers recently sent to us, we notice many articles of permanent

value regarding the mineral resources of Brazil, and, continued from number to number, a very important bibliography of the geology and palæontology of Brazil compiled by Prof. John C. Branner.

SEVERAL plates of illustrations of the zoology of the Royal Indian Marine Survey ship *Investigator* have been received from the Indian Museum. The illustrations include Crustacea (Malacostraca and Entomostraca) and Mollusca, and have been prepared under the direction of Dr. A. Alcock, F.R.S., Dr. N. Annandale, and Mr. A. C. MacGilchrist.

A "HANDY Guide to Photographic Requisites," which is a conveniently arranged price list of photographic apparatus, materials, and pure chemicals, has been published by Messrs. Reynolds and Branson, Ltd., of Leeds.

THE much-discussed question of the structure of cyanic acid forms the subject of a communication by F. Carlo Palazzo and E. Carapelle in the *Gazzetta* (vol. xxxvii., ii., p. 184). It is pointed out that, while Nef's experiments have shown that esters of the structure OR.C:N derived from normal cyanic acid do not exist, he still adheres illogically to the view that the free acid and its alkali salts are of the normal constitution. The argument that Nef advanced, that the free *iso*-acid, CO:NH, would be unstable in presence of water and undergo change into the normal acid, should, on his own showing, from the great power of addition possessed by the group .C.N, be reversed. Cyanic acid when esterified at so low a temperature as  $-5^{\circ}$ , by means of diazomethane or diazoethane, gives esters of the *iso*-type CO:NR alone. In view of the fact that the somewhat analogous  $\alpha$ -pyridone gives only oxygen esters under similar conditions, and of the probability that isomeric change is excluded at so low a temperature, it is concluded that the free acid and its salts have the *iso*-structure. The same conclusion was also recently arrived at by Chattaway and Wadmore using a less direct argument.

### OUR ASTRONOMICAL COLUMN.

#### ASTRONOMICAL OCCURRENCES IN JUNE:—

- June 1. Mars. Apparent Diameter =  $17''.6$ .  
 9. 1h. Vesta in conjunction with Moon. Vesta  $0^{\circ} 11' N$ .  
 10. 23h. 37m. Mercury in conjunction with  $\epsilon$  Geminorum (mag. 3.2). Distance between centre of planet and star about  $25''$ .  
 12. 2h. Mercury in conjunction with Neptune. Mercury  $2^{\circ} 51' N$ .  
 15. 8h. Mercury in conjunction with Jupiter. Mercury  $1^{\circ} 41' N$ .  
 18. 10h. 46m. Minimum of Algol ( $\delta$  Persei).  
 19. Uranus  $\frac{1}{2}^{\circ}$  S. of  $\nu^2$  Sagittarii (mag. 5.2).  
 22. 2h. Sun enters Cancer, Summer commences.  
 23. Uranus  $\frac{1}{2}^{\circ}$  S. of  $\nu^1$  Sagittarii (mag. 5.0).  
 24. 11h. 40m. to 12h. 48m. Moon occults  $\xi$  Ophiuchi (mag. 4.5).  
 26. Mercury at greatest elongation ( $25^{\circ} 28' E$ ).

MAGNITUDES OF MIRA, DECEMBER 14, 1906, TO FEBRUARY 16, 1907.—The results of a number of naked-eye observations of Mira, made at the Radcliffe Observatory during the recent maximum brightness of this star, are published in the Monthly Notices (R.A.S.) for April (vol. lxvii., No. 6, p. 41), together with some notes on the star's colour.

The greatest magnitude, 2.06, during the period of observation was recorded on December 27, when Mr. Robinson found the colour of Mira to be similar to that of  $\alpha$  Arietis, i.e. yellow. Examined with the Barclay equatorial on January 11, the image of Mira showed red